11. Reka

Program Name: Reka.java **Input File: reka.dat**

Reka and her friend are playing a game. Her friend has a palindromic string of lowercase letters. A palindrome is a string that reads the same forwards and backwards. For example, "racecar" and "moon" are palindromes, while "truck" and "sun" are not palindromes.

Reka has to guess what her friend's string is. She's given L, the length of the string and C clues. Each clue gives the letter in some position of the string. Reka's been guessing for a while, and thinks the game is unfair since there's potentially many possibilities. Write a program to count the number of valid palindromes that are consistent with the given clues.

Input: The first line of input contains an integer T (1 <= T <= 50), the number of test cases. Each test case begins with two integers L (1 <= L <= 10^18) and C (0 <= C <= min(L, 200)), the length of the string and the number of clues. Then follow C lines of clues. Each clue is an index into the string and a lowercase character. Reka and her friend use 1-indexing to refer to the characters in the string. All indexes for a given test case are distinct.

Note that the length of the string will not fit into a 32-bit integer.

Output: For each test case, output the number of different palindromes that are consistent with the clues given. Format your answer with the case number as in the samples. Since the answer can be very very large, output just the last 9 digits of the answer.

Sample Input:

```
3
2 1
2 a
2 2
1 a
2 b
4 0
```

Sample Output:

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Case #1: 1
Case #2: 0
Case #3: 676
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Sample Explanation: In the first case, the first character in the string has to be an 'a' to make the result a palindrome, so there is 1 valid answer.

In the second case, all characters are given and the resulting string is not a palindrome. Therefore the answer is 0.

In the third case, there are no clues. Some of the valid palindromic strings of length 4 are "abba" and "zzzz". Funnily enough, the number of ways to make this string a palindrome is a palindrome itself!